

an second substrate, parallel to the first substrate, having a plurality of openings, wherein the openings are aligned along a direction from a tip of the V-like structures and vertical to a long edge of the baguette pixel structure; and

a liquid crystal layer located between the first substrate and the second substrate, wherein the W-like extruding structure abuts the liquid crystal layer.

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-8. Specifically, the Office Action rejected claims 1-3 and 6 under 35 U.S.C. 102(b), as being anticipated by Nagae et al. (U. S. Patent No. 5,995,190). In addition, the Office Action rejected claims 7 and 8 under 35 U.S.C. 102(b), as being anticipated by Tomita et al. (U.S. Patent No. 5,926,246). Applicants have amended claims 1 and 7 to improve clarity. Claims 1-8 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to a pixel structure for a liquid crystal display has a first substrate with respect to a pixel region. A W-like extruding structure composed of two V-like is formed on a surface of the substrate. A second substrate with several openings is also provided in parallel to the first substrate. The openings of the second substrate are aligned along a direction from a tip of the V-like to an edge of the pixel. Moreover, a liquid crystal layer is

located between the first substrate and a second substrate, wherein the extruding structure abuts the liquid crystal layer.

Discussion of Office Action Rejections

The Office Action suggests an IDS about the listing of references in the specification. Actually, the listing of references is to apply the priority of the present invention. Applicants have deleted the statement in the specification.

The Office Action also requires amendment on the drawings to show all of the features. However, Applicants believe that the features with respect to claims 4-7 have been shown in the FIG. 2. In FIG. 2, the pixel 70 on top view has the shape being quadrate, that is also, tetragon. However, the quadrate shape can be a rectangular shape or baguette. The V-like structure 62 has the tip angle, which can be a right angle. The W-structure clearly is composed of two V-like structures. Therefore, it is believed that the features with respect to claims 4-7 have been shown in the FIG. 2. Applicants then do not amend the drawings.

Now turning to the substantial rejections, the Office rejected claims 1-3 and 6 under 35 U.S.C. 102(b), as being anticipated by Nagae et al.. The Office Action also rejected claims 7 and 8 under 35 U.S.C. 102(b), as being anticipated by Tomita et al.. Applicants respectively traverse the rejections for at least the reasons set forth below:

First, the present invention is directed to the LCD structure with a design of multi-domain vertical alignment, in which is the liquid crystal molecules are perpendicular to the substrate. In this situation, *a specific protruding structure is formed on the substrate from the top view.*

The present invention, as shown in FIG. 2, includes the extruding structures 62 on the substrate 52 and openings 64 in the substrate 56. As a result, one pixel cell 70 can be divided into multiple sub-regions, in which the LC molecules will have their own twisting direction. *It should be noted that FIG.2 is a top view but not a side view.* The first substrate, i.e., 52 has the W-like extruding structure and the second substrate, i.e., 56 has the multiple openings 64. The openings 64 have been aligned. The openings 64 also have the geometric shapes further recited in claims 2 and 8. The features have been recited in independent claim 1 as follows:

1. A pixel structure for a liquid crystal display with a design of multi-domain vertical alignment, the pixel structure comprising:

a first substrate, with respect to a pixel, having a W-like extruding structure composed of two V-like structures formed on a surface of the first substrate;

an second substrate, parallel to the first substrate, having a plurality of openings, wherein the openings are aligned along a direction from a tip of the V-like structures to an edge of the pixel structure; and

a liquid crystal layer located between the first substrate and the second substrate, wherein the W-like extruding structure abuts the liquid crystal layer.

(Emphasis added.) Likewise, independent claim 7 recites the features as follows:

7. A baguette pixel structure with a design of multi-domain vertical alignment, comprising:

a first substrate having a W-like extruding structure composed of two V-like structures formed on a surface of the first substrate;

an second substrate, parallel to the first substrate, having a plurality of openings, wherein the openings are aligned along a direction from a tip of the V-like structures and vertical to a long edge of the baguette pixel structure; and
a liquid crystal layer located between the first substrate and the second substrate, wherein the W-like extruding structure abuts the liquid crystal layer.

(Emphasis added.) The features emphasized above in claims 1 and 7 at least have not been disclosed by the prior art references.

In re Nagae et al., Figs. 8A-8B are in cross-sectional views (col. 6, line 65 – col. 7, line 3). The two substrates have the conical shaped concave portion (col. 14, lines 42-44; col. 15, lines 4-8). Fig. 8 discloses the similar structures of the two substrates but with a shift (col. 15, lines 30-34). Therefore, the structures in Figs. 8A-8B do not disclose the structure from the top view. Furthermore, according to the conical shaped concave portion, it can be understood that the substrate should have multiple circle portions in the conical shaped structure from the top view. This does not disclose the W-like structure on the substrate (from i.e. top view but not from side view).

Furthermore, *Nagae et al. failed to disclose the aligned openings in the second substrate as recited in claims 1 and 7.*

Therefore, Nagae et al. failed to disclose all of the features recited in independent claim 1 or 7 as well as in dependent claims 2 and 8.

In re Tomita et al., with the similar reason to the Nagae et al. fail to disclose the extruding structure on the first substrate and multiple aligned openings on the second substrate. In Fig. 8A of Tomita et al, even though the alignment layer 14 has several concave strips, so as to align the

LC molecules. The surface of the alignment layer 14 clearly has no W-like extruding structure from the top view. *A top view of the alignment layer 14 should appear as the multiple strips.*

Also and, Tomita et al. failed to disclose the aligned openings in the second substrate.

Therefore, Tomita et al. failed to disclose all of the features recited in independent claim 7 or 8 as well as in dependent claims 2 and 8.

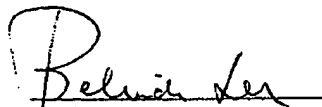
For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and 7 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-6 and 8 patently define over the prior art references as well.

CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims 1-8 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

Date : October 31, 2002


Belinda Lee
Registration No. 46,863

J.C. Patents
4 Venture, Suite 250
Irvine, CA 92618
Tel.: (949) 660-0761
Fax : (949) 660-0809

FAX RECEIVED

NOV 07 2002

TECHNOLOGY CENTER 2800

VERSION WITH MARKINGS TO SHOW WHERE CHANGES MADE

In The Claims

Please amend claims 1 and 7 as follows:

1. (Once Amended) A pixel structure for a liquid crystal display, with a design of multi-domain vertical alignment (MVA), the pixel structure comprising:

a first substrate, with respect to a pixel, having a W-like extruding structure composed of two V-like structures formed on a surface of the first substrate;

an second substrate, parallel to the first substrate, having a plurality of openings, wherein the openings are aligned along a direction from a tip of the V-like structures to an edge of the pixel structure; and

a liquid crystal layer located between the first substrate and the second substrate, wherein the W-like extruding structure abuts the liquid crystal layer.

7. (Once Amended) A baguette pixel structure with a design of multi-domain vertical alignment, comprising:

a first substrate having a W-like extruding structure composed of two V-like structures formed on a surface of the first substrate;

an second substrate, parallel to the first substrate, having a plurality of openings, wherein the openings are aligned along a direction from a tip of the V-like structures and vertical to a long edge of the baguette pixel structure; and

a liquid crystal layer located between the first substrate and the second substrate, wherein the W-like extruding structure abuts the liquid crystal layer.

FAX RECEIVED
NOV 07 2002
TECHNOLOGY CENTER 2800